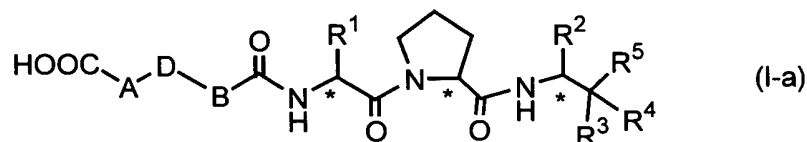


## CLAIMS

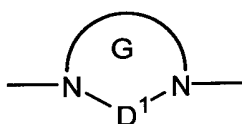
1. A heterocyclic compound of the formula (I-a):



wherein \* means that the carbon atom marked with \* is an asymmetric carbon atom,

A and B are the same or different and each is a lower alkylene group being optionally substituted by an oxo group,

D is a heteromonocyclic or heterobicyclic group of the following formula:



wherein D<sup>1</sup> is a methylene group or an ethylene group, and these groups may optionally be substituted by an oxo group, Ring G is a 5- to 14-membered, saturated or unsaturated, heteromonocyclic or heterobicyclic group optionally having other heteroatoms selected from a nitrogen atom, an oxygen atom and/or a sulfur atom, and said heterocyclic group being optionally substituted by a substituent T<sup>1</sup>, in which T<sup>1</sup> is the same or different 1 to 3 groups selected from

- (i) an oxo group,
- (ii) a substituted or unsubstituted lower alkyl group,
- (iii) a substituted or unsubstituted amino group,
- (iv) a substituted or unsubstituted carbamoyl group,
- (v) a carboxyl group or a lower alkoxy carbonyl group,

(vi) a phenyl group being optionally substituted by a halogen atom, a lower alkoxy group or a lower alkyl group, and

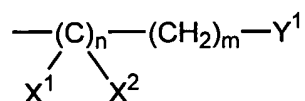
(vii) a substituted or unsubstituted lower alkylcarbonyl group,

$R^1$  and  $R^2$  are the same or different and each is a lower alkyl

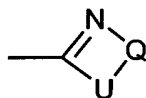
group,

$R^3$  and  $R^4$  are different from each other, and each is a hydrogen atom or a hydroxy group, or both combine together to form an oxo group,

$R^5$  is a group of the formula:



wherein  $X^1$  and  $X^2$  are a halogen atom,  $Y^1$  is a hydrogen atom, a halogen atom, a lower alkoxy carbonyl group, a lower alkylaminocarbonyl group, an aralkylaminocarbonyl group, an aralkyloxycarbonyl group, a lower alkylcarbonyl group, or an aralkylcarbonyl group, or a group of the following formula:



wherein U is an oxygen atom or a sulfur atom, Q is a vinylene group or an orthophenylene group being optionally substituted by  $T^2$ ,  $T^2$  is 1 to 3 groups selected from a halogen-substituted or unsubstituted lower alkyl group, a lower alkoxy group, a lower alkylsulfonyl group, a lower alkylcarbonyloxy group and an amino group being optionally substituted by a lower alkyl group,

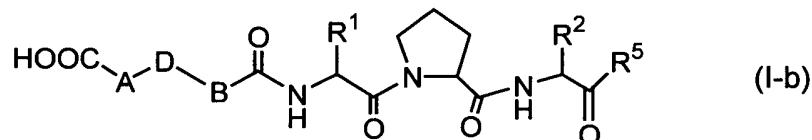
n is 0, 1 or 2, and

m is an integer of 0 to 5,

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or its ester, or a salt thereof.

2. The heterocyclic compound according to claim 1, which is a compound of the following formula (I-b):



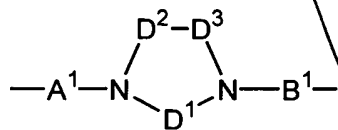
5 wherein A, B, D, R<sup>1</sup>, R<sup>2</sup> and R<sup>5</sup> are as defined in claim 1, or its ester, or a salt thereof.

3. The heterocyclic compound according to claim 1 or claim 2, wherein the group of the formula: -A-D-B- is a group of the following formula:



10 wherein A, B and D<sup>1</sup> are as defined in claim 1, Ring G' is a 5- to 9-membered, saturated or unsaturated heteromonocyclic group having 1 to 3 of other heteroatom selected from a nitrogen atom, an oxygen atom and/or a sulfur atom, and said heteromonocyclic group may have 1 to 3 substituents T<sup>1</sup> which are as defined in claim 1, or its ester, or a salt thereof.

4. The heterocyclic compound according to claim 1 or claim 2, wherein the group of the formula: -A-D-B- is a group of the following formula:



20 wherein A<sup>1</sup> is a methylene group or a group of the formula: -CH<sub>2</sub>CO-, B<sup>1</sup>

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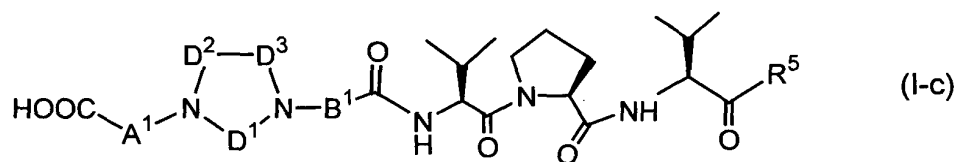
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5 *Sub A2* is a methylene group or a group of the formula:  $-\text{COCH}_2-$ ,  $\text{D}^2$  and  $\text{D}^3$  are the same or different and each is a vinylene group being optionally substituted by a lower alkyl group, or a methylene group being optionally substituted by an oxo group or a lower alkyl group,  $\text{D}^1$  is as defined in claim 1, provided that both  $\text{D}^2$  and  $\text{D}^3$  should not simultaneously be a vinylene group being optionally substituted by a lower alkyl group, or its ester, or a salt thereof.

10 5. The heterocyclic compound according to claim 4, which is a compound of the following formula (I-c):



wherein  $\text{D}^1$  and  $\text{R}^5$  are as defined in claim 1, and  $\text{A}^1$ ,  $\text{B}^1$ ,  $\text{D}^2$  and  $\text{D}^3$  are the same as defined in claim 4, or its ester, or a salt thereof.

15 6. The heterocyclic compound according to claim 5, which is selected from the following compounds, its ester, or a salt thereof:

Compound 1: 2-(3-carboxymethyl-2-oxo-1-imidazolidinyl)acetyl-L-valyl-N-[(1S)-3,3,3-trifluoro-1-isopropyl-2-oxopropyl]-L-prolinamide;

20 Compound 2: 2-(3-carboxymethyl-2,4-dioxo-1-pyrimidinyl)-acetyl-L-valyl-N-[(1S)-2-(2-benzoxazolyl)-1-isopropyl-2-oxoethyl]-L-prolinamide;

Compound 3: 2-(4-carboxymethyl-2,3-dioxo-1-piperazinyl)acetyl-L-valyl-N-[(1S)-2-(2-benzoxazolyl)-1-isopropyl-2-oxoethyl]-L-prolinamide;

Compound 4: 2-(3-carboxymethyl-2,4-dioxo-1-pyrimidinyl)-

acetyl-L-valyl-N-[(1S)-3-benzylamino-1-isopropyl-2,3-dioxopropyl]-L-prolinamide,

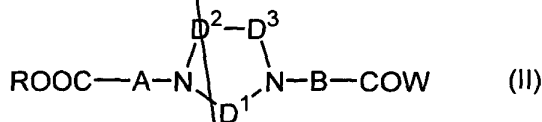
Compound 5: 2-(4-carboxymethyl-2,5-dioxo-1-piperazinyl)acetyl-L-valyl-N-[(1S)-2-(2-benzoxazolyl)-1-isopropyl-2-oxoethyl]-L-prolinamide;

Compound 6: 2-(3-carboxymethyl-2,5-dioxo-1-imidazolidinyl)-acetyl-L-valyl-N-[(1S)-3,3,3-trifluoro-1-isopropyl-2-oxopropyl]-L-prolinamide; and

Compound 7: [[4-(2-carboxyacetyl)-1-piperazinyl]malonyl]-L-valyl-N-[(1S)-2-(2-benzoxazolyl)-1-isopropyl-2-oxoethyl]-L-prolinamide.

7. A mixture comprising 90 % or more of 2-(3-carboxymethyl-2-oxo-1-imidazolidinyl)acetyl-L-valyl-N-[(1S)-3,3,3-trifluoro-1-isopropyl-2-oxopropyl]-L-prolinamide (Compound 1), or a salt thereof, and the remaining % consisting substantially of a stereoisomer of Compound 1 or a salt thereof.

8. A heterocyclic compound of the following formula (II):



wherein A and B are the same or different and each is a lower alkylene group being optionally substituted by an oxo group,

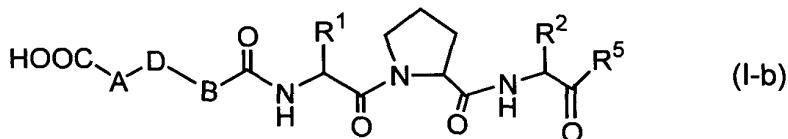
D<sup>1</sup> is a methylene group or ethylene group being optionally substituted by an oxo group,

D<sup>2</sup> and D<sup>3</sup> are the same or different and each is a vinylene group being optionally substituted by a lower alkyl group, or a methylene group being optionally substituted by an oxo group or a lower alkyl group,

R is a protecting group for carboxyl group,

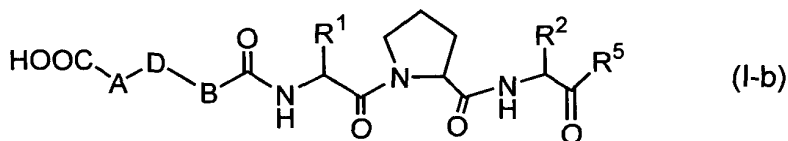
W is a hydroxy group, a halogen atom or a residue of an active carboxylic acid ester, provided that one of A, B, D<sup>1</sup>, D<sup>2</sup> and D<sup>3</sup> is a group being substituted by an oxo group, and both D<sup>2</sup> and D<sup>3</sup> should not simultaneously be a vinylene group being optionally substituted by a lower alkyl group, or a salt thereof.

9. A human neutrophilic elastase inhibitor containing as the active ingredient a compound of the following formula (I-b):



wherein A, B, D, R<sup>1</sup>, R<sup>2</sup> and R<sup>5</sup> are as defined in claim 1, or a pharmaceutically acceptable salt thereof.

10. A pharmaceutical composition containing as an active ingredient a compound of the following formula (I-b):



wherein A, B, D, R<sup>1</sup>, R<sup>2</sup> and R<sup>5</sup> are as defined in claim 1, or a pharmaceutically acceptable salt thereof.

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